

LISTING OF THE CLAIMS

Claim 1 (original). A semiconducting device comprising:

a channel region located in an SOI layer of an SOI substrate, wherein said channel region is thinned by the presence of an underlying localized oxide region that is located on top of and in contact with a buried insulating layer of said SOI substrate, said localized oxide region is self-aligned to a gate region that is located above said channel region.

Claim 2 (original). The semiconducting device of Claim 1 wherein said channel region has a thickness of less than approximately 50.0 nm.

Claim 3 (original). The semiconducting device of Claim 1 wherein said channel region has a thickness ranging from approximately 2.0 nm to approximately 25.0 nm.

Claim 4 (original). The semiconducting device of Claim 1 further comprising spacers abutting said overlying gate region.

Claim 5 (original). The semiconducting device of Claim 1 wherein said SOI layer further comprises source/drain extension regions abutting said channel region.

Claim 6 (currently amended). The ~~semiconductor~~ semiconducting device of Claim 1 wherein said SOI layer comprises Si, SiGe, SiGeC, SiC or combinations thereof.

Claim 7 (original). The semiconducting device of Claim 1 wherein said localized oxide region has a thickness ranging from about 25.0 nm to about 65.0 nm.

8. The semiconductor device of Claim 1, wherein said buried insulating layer has a uniform thickness ranging from about 150.0 nm to about 200.0 nm.

Claim 9 (currently amended). The ~~semiconductor~~ semiconducting device of Claim 1 wherein said localized oxide region comprises a thermal oxide, an implanted oxide, or a combination thereof.

Claim 10 (currently amended). The ~~semiconductor~~ semiconducting device of Claim 5 wherein said source/drain extension regions have a thickness ranging from about 30.0 nm to about 70.0 nm.

Claim 11 (currently amended). The semiconducting device of Claim 5 wherein source/drain extension regions comprise a doped region of said SOI layer, wherein said ~~dopant~~ doped region is doped with an n-type dopant or p-type dopant.

Claim 12 (original). The semiconducting device of Claim 5 further comprising silicide regions positioned on said source/drain extension regions.

Claim 13 (original). The semiconducting device of Claim 1 wherein said SOI layer further comprises isolation regions.

Claim 14 (currently amended). The ~~semiconductor~~ semiconducting device of Claim 1 having an external resistance ranging from about 200.0 Ohm/ μm to about 400.0 Ohm/ μm .

Claim 15 (original). A semiconducting device comprising:

a silicon-on-insulator structure comprising an SOI layer located atop a buried insulating layer, said SOI layer having a channel region which is thinned by the presence of an underlying localized oxide region that is located on top of and in contact with said buried insulating layer; and

a gate region located atop said SOI layer, wherein said localized oxide region is self-aligned with the gate region.

Claim 16 (withdrawn). A method of forming a thin channel MOSFET comprising:

providing an SOI substrate having a buried insulating layer underlying an SOI layer;

forming a pad stack atop said SOI layer;

forming a dummy gate region atop said pad stack;

providing a localized oxide region that is located on top of and in contact with said buried insulating layer thereby thinning a portion of said SOI layer, said thinned portion of said SOI layer defining a channel;

forming source/drain extension regions in said SOI layer abutting said thinned portion of said SOI layer; and

replacing said dummy gate region with a gate region, wherein said localized oxide region is self-aligned with said gate region.

Claim 17 (withdrawn). The method of Claim 16 wherein said pad stack comprises a pad oxide layer.

Claim 18 (withdrawn). The method of Claim 16 wherein said providing localized oxide region comprises:

implanting oxygen at least through said dummy gate region to create a dopant profile in a portion of said SOI layer self-aligned to said dummy gate region; and

annealing said substrate to convert said dopant profile into the localized oxide region, said localized oxide region is located on top of and in contact with said buried insulating layer thereby thinning said SOI layer.

Claim 19 (withdrawn). The method of Claim 18 wherein said dummy gate region comprises a cap atop a sacrificial gate material, said dummy gate region further comprising nitride spacers abutting said dummy gate region.

Claim 20 (withdrawn). The method of Claim 19 wherein said sacrificial gate material is poly-silicon.

Claim 21 (withdrawn). The method of Claim 18 wherein said dummy gate region has a height ranging from about 130.0 nm to about 250.0 nm.

Claim 22 (withdrawn). The method of Claim 18 wherein said implanting oxygen comprises a dopant concentration ranging from $8 \times 10^{16} \text{ cm}^{-2}$ to $3 \times 10^{17} \text{ cm}^{-2}$.

Claim 23 (withdrawn). The method of Claim 18 wherein said implanting oxygen comprises an implant energy ranging from 30.0 keV to 60.0 keV.

Claim 24 (withdrawn). The method of Claim 18 wherein said implanting oxygen comprises an ion implantation apparatus having a current beam density ranging from about 5.0 mA cm^{-2} to about 10.0 mA cm^{-2} .

Claim 25 (withdrawn). The method of Claim 16 wherein said replacing said dummy gate region with said gate region comprises:

forming a blanket oxide layer atop said substrate co-planar with said dummy gate region;

etching said dummy gate region to expose said pad stack;

etching said pad stack selective to said channel region;

forming a gate dielectric layer atop said channel region; and

forming a gate conductor material atop said gate dielectric layer.

Claim 26 (withdrawn). The method of Claim 25 wherein said replacing said dummy gate with said gate region further comprises forming a conformal nitride liner atop said dummy gate region prior to said forming said blanket oxide layer.

Claim 27 (withdrawn). The method of Claim 25 wherein said removing said dummy gate region further comprises etching said cap selective to said sacrificial gate material and etching said sacrificial gate material selective to said pad stack.

Claim 28 (withdrawn). The method of Claim 27 where said sacrificial gate material is removed using chemical deposition etching or KOH stopping atop said pad oxide layer.

Claim 29 (withdrawn). The method of Claim 25 where said etching said pad stack comprises a chemical oxide removal process including a vapor or plasma of HF and NH₃.

Claim 30 (withdrawn). The method of Claim 25 where said gate dielectric layer is formed by thermal oxidation.

Claim 31 (withdrawn). The method of Claim 25 wherein said forming said gate region comprises blanket depositing a gate conductor material atop said blanket oxide layer and atop said gate dielectric and planarizing said gate conductor material until said gate conductor material is coplanar with said blanket oxide layer.